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ABSTRACT

This practicum was designed to remediate handwriting skills in school-aged children who displayed visual-motor deficiencies that affect mechanical skills. Practicum goals were to: (1) identify and diagnose children with handwriting delays; (2) involve school and parent interaction by involving them with pre- and post-program assessment; (3) involve identified children in a visual-motor program to develop mechanical abilities; and (4) measure data to assess effects of training on individual children. Ten students referred to a private clinic providing educational, psychological, rehabilitation, visual, and medical services served as subjects. Practicum activities included using computer programs to develop visual tracing, closure, pursuits, and spatial integration and using haptic writing and visual auditory tactile kinesthetic integration to reinforce the visual-motor process. Results indicated that 8 of 10 children showed improvement in visual-motor integration skills, 5 children showed improvement in visual skills related to handwriting functioning, and parents and teachers reported significant improvements in children's handwriting abilities. Appendices contain a referral form, a case history form, a handwriting checklist, a handwriting inventory, and a discussion of remediation techniques for improving handwriting. (Contains 40 references.) (JDD)

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ED 374 602

Educational Interventions for Visual-Motor Deficiencies that Affect Handwriting in School-Aged Children

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by

Timothy J. Dikowski

Cluster 54

A Practicum I Report Presented to the
Ed.D. Program in Child and Youth Studies
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Nova Southeastern University

1994

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PRACTICUM APPROVAL SHEET

This practicum took place as described.

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This practicum report was submitted by Timothy J. Dikowski under the direction of the adviser listed below. It was submitted to the Ed.D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Approved:

8-10-94
Date of Final Approval of Report

Mary W. Staggs Ed.D.
Mary W. Staggs, Ed.D.
Adviser

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ABSTRACT

Educational Interventions for Visual-Motor Deficiencies that Affect Handwriting in School-Aged Children. Dikowski, Timothy J., 1994: Practicum Report, Nova Southeastern University, Ed.D. Program in Child and Youth Studies. Special Education, Visual Processing, Developmental Skills, Eye-Hand Coordination, Visual-Motor Integration.

A cross section of young children were selected for remedial intervention in the area of handwriting. These children had various abilities and backgrounds with specific handicapping conditions being ruled out. Specific practicum goals were to 1) identify and diagnose children with handwriting delays, 2) involve school and parent interaction by involving them with pre and post program assessemnt, 3) involve specific identified children in a visual-motor program to develop mechanical abilities, 4) measure data to assess affects of training on individual children, 5) report findings of training to all involved parties.

It was the basic finding of this practicum that children's visual-motor and handwriting skills can show improvement after remediation. Follow-up remedial treatment and research is recommended to pursue and further investigate the long term merit of training handwriting skills of young children.

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CHAPTER I

INTRODUCTION

Description of Community

The writer's work setting is a private clinic geographically located in a midwestern, rural, and light industrial community bordering two states. The mid-sized community is a hub of business, industry, and services. Many smaller towns and counties across a state line feed into the city. As with most rural areas comprehensive services for sparsely populated communities are difficult to procure. For this reason the clinic is unique in that it serves a cross section of children's needs.

Socioeconomic status ranges from high to low income. In recent years many middle level, blue collar jobs have left the area. Many services are located in this community such as medical, educational, law, and related professions. There are three four-year colleges, one technical college, and several smaller post secondary training schools in the community. Because of these factors, this area is fast becoming a region of low income or high income with a dwindling population of middle income families.

The private clinic where the writer works is located in close proximity to a major hospital and a diverse medical community. Physically speaking it is within one city block of the largest hospital within fifty miles. Consequently, the geographic location for client accessibility is excellent and very convenient. Included in this medical community is a major mental health clinic, rehabilitation facility, cancer treatment center, cardiac unit, and a center for children with severe and profound handicapping conditions. This medical structure serves two states and twelve rural counties.

The clinic provides educational, psychological, rehabilitation, visual, and medical services. These services are provided to private individuals, vocational rehabilitation, departments of public welfare, trauma center patients, children's hospital, public and private schools, state and federal prisons, and day care facilities.

Writer's Work Setting and Role

The writer had a unique opportunity to blend a public school background into a private educational setting. For many years the writer worked in the public schools as a special education teacher and school administrator. A rare opportunity arose that facilitated using educational training and experience in the private sector. This setting afforded the writer with being able to provide for the needs of special children.

The writer works with other professionals providing a multidisciplinary team specializing in the assessment and treatment of visual disorders that affect functional skills. This diagnostic team is comprised of an optometrist, an educator, and a psychologist trained in the area of vision disorders. The writer serves as the director of educational services and provides both direct and indirect treatment to school-aged children.

The population consists of a cross section of children of varying abilities, skills, backgrounds, and ethnic origin. These children display visual-motor and visual deficiencies that affect mechanical abilities needed in the educational setting.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

The referral process includes receiving students from a multitude of sources. Children are referred by parents, school personnel, doctors, eye care professionals, and psychologists (see Appendix A).

Many of these school-aged children demonstrate visual-motor integration deficits that affect mechanical aspects of eye-hand coordination skills needed for writing, spelling, mathematic calculation, and written expression. Children who have undiagnosed visual-motor integration deficiencies present difficulty with handwriting. Specific problems with letter formation, near/far copy tasks, and spatial arrangement are generally apparent.

Historically, handwriting proficiency was once an integral part of school curriculums. However, it is the writer's experience that few if any public schools concentrate on instructing and developing penmanship abilities. Consequently, remedial programs that address specific visual motor skills of children are not readily

available. The author verified through telephone contacts that the public schools in the local area do not have remedial programs for children with needs in mechanical eye-hand and writing skills. Also, the writer found that parents are seeking services for children with needs in these areas. A conclusion was that the need for remediation and treatment outweighed the programming available in the public or private sector. A fertile ground existed for specific programs to develop visual-motor capabilities that have direct influence on the mastery of handwriting.

A problem exists in that many school-aged children demonstrate visual-motor integration deficits that affect mechanical aspects of eye-hand coordination skills needed for writing, spelling, mathematic, and written expression. It appears that visual-motor integration programs to enhance handwriting are not available in the community, nor is training provided in the school setting.

Problem Documentation

A great deal of evidence documenting the incidence of visual-motor integration deficiencies exists. Evidence was documented through clinic intake data. Information regarding the client was collected and used as a means for gathering background and history (see Appendix B). This background information found that 9 of 10 school-aged children referred for academic or behavior disorders demonstrated insufficient visual-motor development (see

Table 1). This background information was used to determine whether problems were chronic, long-term, or found in other family members. Another fact gathered by the writer was that intake information revealed that 80% of parents questioned previously sought public school services for visual-motor deficiencies or handwriting.

A telephone survey of local public and private schools indicated that no programs in visual-motor integration were offered. When questioned further it was found that no remedial or treatment programming was in place to develop handwriting or related skills (see Table 2). All schools indicated that both manuscript and cursive writing was taught and considered part of the curriculum. However, specific remedial programs were not in place. If a child failed to master basic handwriting skills and needed further instructional methods or training, parents were forced to seek private services.

Causative Analysis

There were a variety of reasons for problems related to the development of visual-motor competencies involving handwriting. Medical problems are a major contributing factor for the lack of skill development, Klein (1988) noted that children with low birthweights were predisposed to having significantly more problems with visual-motor tasks than children with normal birthweights. The

Table 1

Clinical Intake Information Specifying Concerns

	Academic Concern	Behavior Concern	No Problems Indicated
Child 1	X	X	
Child 2	X		
Child 3		X	
Child 4	X	X	
Child 5		X	
Child 6	X		
Child 7			X
Child 8	X	X	
Child 9	X		
Child 10	X	X	

Table 2

Results of Telephone Surveys

	Handwriting Is Essential To Curriculum	Handwriting Is Essential For School Success	Programs Available On School Campus	Private Programs Are Available Off Campus
Private Schools	X	X		X
Public Schools	X	X		X
Parents	X	X		X

significance of this study is that marked deviance in birthweight is a predictor of school achievement in primary grades.

According to the American Optometric Association and Farren (1984), academic performance and visual tactile coordination skills are highly correlated. Richards (1985) expands on the idea that the poorer the performance academically, the greater the chance that a breakdown in eye-hand coordination is involved. Individuals with diagnosed deficits in fine motor skills are likely to have visual-motor delays. Causes include undetected and undiagnosed dysfunctions such as near point blur, convergence insufficiency, saccadic eye movement, and diplopia. Richards (1985) found that handwriting competencies can be a result of unresolved problems in the vision system.

Extensive writing has been provided about the importance of eye-hand coordination (Getman, 1985). He advocates that one of the most critical ways to judge a kindergarten student is on the development of eye-hand skills. His conclusion was that the human system developed as a result of specific motor activity and that complete sensory-motor activities bring about the integration of all processing systems. Young children develop and explore by combining the use of hands and eyes to perform specific tasks.

Getman's (1985) work made the distinction that the ultimate skills of man is the unique ability to use the hands and eyes. The result is a combination known as visual-tactual integration skills. These skills are considered to be of great significance in the ability to write. The ability to write is truly one of the most important factors in the academic process. Getman (1992) also points out that much of the reason for early failure lies in the fact that fine motor action is only developed after gross motor action. Many children have not learned the more generalized gross motor movements of arm and hand prior to attempting the fine motor integration process of hand and eye. This phenomena is what Getman describes as synchrony. Children showing problems in this aspect of visual performance demonstrate an inability to synchronize the eye, the brain, and the hand into a productive system. One must remember that hands will only do what the brain directs them to visually perform. A need for elaborate integration of all these functions is what is called the system for visual tasks and movement (Getman, 1992).

Disorders such as cerebral palsy, multiple sclerosis, and traumatic brain injury cause significant deficiencies in visual-motor integration skills that affect handwriting. Aksionoff and Falk (1992) report that in traumatic brain injured patients deficits in the overall development of visuomotor integration will manifest itself in motor skills

for writing and copying. Aksionoff and Falk (1992) also elaborate on the fact that graphomotor deficits are due to motor weaknesses that significantly affect the way mechanical reproduction skills are developed. Dorman (1987) found subtle developmental differences in cognitive and academic growth in neurologically impaired children who have cerebral palsy, spina bifida, and muscular dystrophy.

Specific motor dysfunction resulting from lesion to the immature central nervous system as found in cerebral palsy has a great effect on all motor development. Cerebral palsy is a motor dysfunction where severe damage has occurred to the cortex of the brain. Basic reflexes are primary in the stages of motor development. Since reflexes are the initial step in gross, fine, and visual-motor interaction, the individual with cerebral palsy is also at greater risk than the general population for visual dysfunctions. In addition a predisposition exists for related disorders in the cerebral palsy child (Sears, 1985).

Research documents visual-motor integration deficits in children who are considered developmentally delayed. Gender differences are apparent in visual-motor abilities. Vogel (1990) noted the prevalence of visual spatial delays among school-aged boys when compared to girls of the same age and grade placement.

Getman (1992) and Gallahue (1993) concluded that deficit or incomplete visual development may make

performance output activities difficult for children. Visuomotor functioning is cyclic and requires multiple sequential and prerequisite steps for complete maturational development. These steps include: incoming stimuli, motor response, assessing motor response, and receiving sensory feedback. A lack of complete visual and motor development during early childhood will influence perceptual motor output function. Areas that can be disturbed are saccadic movement, visual pursuits, form/shape reproduction, pattern discrimination, visual-motor coordination, and perceptions of movement.

Moon, C., Marlowe, M., Stellern, J., & Errera, J. (1985) studies discovered environmental factors such as arsenic, lead, mercury, cadmium, and aluminum found in hair samples of randomly selected elementary-aged children contributed to variable cognitive development. Developmental skills such as visual-motor performance were affected. Exposure to toxic metals is considered a neuro-psychological consequence that is found in children who exhibit decreased motor skills.

Service provision is another causal factor relating to the problem of school-aged children demonstrating visual-motor integration deficiencies that affect mechanical aspects of eye-hand coordination needed for handwriting. Currently there are no mandates that require programs for children who experience visual-motor integration deficits.

According to the telephone interviews conducted with school personnel, all schools contacted reported that no specific programs for remediation of visual-motor integration deficits exists. School personnel indicated through telephone interviews that no programs of this nature exists for school-aged children due to a lack of funds. It appears that there is a general lack of knowledge of the integrative process as it relates to a child's handwriting ability. Hence, the recognition that remedial programs should be offered is not considered a priority among school personnel.

Relationship of the Problem to the Literature

A review of the literature provides adequate information to support the existence of the problem of children exhibiting handwriting deficiencies due to inept visual-motor integration skills. The literature discusses children who demonstrate visual-motor deficiencies that affect their academic performance. Studies of Breen, Carlson, and Lehman (1985) and Lesiak (1984) indicate that visual-motor assessment can contribute to predictability of academic achievement. Getman (1992) focuses on the prevention of educational failure by focusing on the processes of visual skills.

Evidence exist that children's academic performance and standardized test results indicate visual-motor deficiencies. Row (1989) provides data to support that remediation of visual cognition among children with visual

deficits is advantageous. Caskey and Larson (1983) discovered a significant relationship between visual-motor functioning and academic achievement. They based their finding upon test performances of children in first and fourth grades. Knoff and Sperling (1986) assessed gifted children and their visual-motor skills then compared performances on the Bender-Gestalt and the Berry Test of Visual Motor Integration.

Reading, writing, spelling, and arithmetic are specifically affected by poor visual-motor integration skills. Hendrickson (1988), advocates the mastery of visual-motor control in the acquisition of the spelling process. Battle and Lubercane (1985) acknowledges the relationship of achievement in reading, spelling, and arithmetic as related to visual-motor association.

Highsmith (1988) and Farrell (1988) outline prewriting and writing skills as they relate to visual-motor integration and learning disabled children. They advocate a rationale for teaching handwriting through specific procedural techniques.

Alston (1985) conducted a longitudinal study of handwriting of students. She identified normative handwriting samples for children age seven to nine years and advocates the use of handwriting in identifying children who may have special needs. She also reported that students experiencing handwriting difficulties in early years

continue to exhibit mechanical difficulties in subsequent years.

Trap-Porter, Cooper, LaNunziata, Shill and Swisher (1984) compared D'Nealian manuscript instructional materials and Zaner-Bloser handwriting materials utilizing first grade students and found that the children's cursive writing was not enhanced by the newly developed D'Nealian techniques. There were few differences in the production of cursive letters among the study groups of children.

Graham (1986) reviewed handwriting scales and factors that contribute to variability in handwriting scores. He recommends that although handwriting scales should not be used to assess performance on a daily basis, scales can be used as a screening device for identifying students with special needs.

Formsma (1988) states that in order for children to succeed in handwriting skills, teachers should be aware of various evaluative methods for assessing the visual-motor skill of writing. She recommends the use of an evaluation tool which could be used in the remediation process.

The literature reveals that both fine and gross motor delays, visual dysfunction, integrated processing disorders and neuromuscular disorder are causal factors in the development of visual-motor integration. Researchers Erhardt (1990), Gallahue (1983), Mozlin, Rumf, and Solan (1985) discuss developmental visual dysfunction and the

perceptual aspects of visual-motor performance in relation to variances among children. Getman (1992) and Wollacot (1983) note that children have the capacity to adapt their processing skills to particular tasks.

Other topical areas were explored during the research process. Getz (1983), Helveston (1985), Stein and Fowler (1985) conclude that visual functioning is essential to success in the academic process and is essential to success in the academic process and is essential for reaching learning potential. In addition, current literature concludes that correlations exists between visual-motor integration skills and visual health. Stein and Fowler's (1985) documentation identifies the significance of the effects of monocular occlusion on visuomotor perception.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

The goal of this practicum was to effectively remediate handwriting skills in school-aged children who displayed visual-motor deficiencies that affect mechanical skills. Development of these mechanical functions are prerequisite for complete academic achievement.

Expected Outcomes

After the implementation of the practicum it was observed that children improved their handwriting skills. In addition, the targeted children demonstrated specific strategies to help improve their handwriting. Students improved tracing, closure, and spatial integration skills as they pertained to handwriting. Four objectives were designed for this practicum. Objective number one included that 6 of 10 students would improve visual motor integration skills. Objective number two was that with proper prescriptive remediation 4 of every 10 students would improve visual skills. Objective number three included that handwriting skills would show a measurable improvement. Objective number four was that after intervention teachers

and parents would report marked improvement in handwriting abilities.

Measurement of Outcomes

Formal handwriting scales were used to analyze handwriting proficiency. A standardized test of visual-motor integration was used to assess visual-motor integration performance and note marked differences in eye-hand coordination. A teacher inventory indicated visual-motor integration performance (see Appendix C). A parent inventory was used to solicit parental impressions of the child's handwriting skills (see Appendix D).

Teachers and parents reported significant differences in handwriting abilities. Formal and informal measures showed gains in handwriting abilities. A teacher inventory reported improvement in the area of handwriting. A parent inventory indicated improvement in the child's handwriting abilities.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

Many school-aged children demonstrate visual-motor integration deficits that affect mechanical aspects of eye-hand coordination skills needed for writing, spelling, mathematic calculation, and written expression. Visual-motor dysfunctions that affect handwriting can be assessed and remediated through educational appropriate programs.

There are several models of assessment which address visual-motor integration skills. Erhardt (1990) describes four models which includes assessment of the child and the child's environment. Koslowe (1991) describes the association between children's performance on test of intelligence, specifically coding subtests, and notes a correlation between a child's intellectual quotient and his performance on classroom tasks.

Children's visual-motor capabilities can be early predictors of intelligence and school success (Kolata, 1987). Richards (1985) research indicates that if significant visual problems are found in young children it can save many years of academic difficulty. Many of these

children do not develop foundations or prerequisite skills needed in order to perform mechanical activities. Petti (1988) indicated that a student can be identified early in the area of visual-motor control. He also indicated that distortion of angle, integration of adjacent shapes, and overlapping will result in poor spacing of letters and words when writing. These observations serve as early indicators of academic performance.

Eye-hand coordination skills can be enhanced in preschool children, regular education students and learning disabled children through perceptual training. Baily and Hall (1989) advocate training programs for educators and practitioners involved with children who exhibit visual-motor deficiencies. Their training programs generally focus on assessment of the child's visual capabilities, visual attending behaviors, visual examining behaviors, and visually guided motor behaviors.

Blanksby (1992) presents practical implications and intervention strategies for inattentive children. One of the objectives of his intervention program includes prompting or facilitating an overt response. He promotes the use of a variety of activities during remedial therapy. In Erhardt's (1990) writings she encourages a transdisciplinary managerial approach using a cross section of paraprofessionals, professionals and family. She promotes the utilization of four theoretical models for

management of a child with visual deficits that affect the learning process. The medical model deals with anatomy, physiology, and neurology of the optical system. The educational model predominately includes perception and learning. The developmental model includes involuntary and voluntary interaction between the visual and motor mechanisms. The functional model incorporates daily application of the vision system and the educational environment.

Farrell (1988) published specific strategies for teaching handwriting skills. Skills addressed in this classroom guide include eye-hand coordination, manuscript writing strokes, linking letters in cursive, pencil grip, baseline orientation, and spatial skills, and strength development for hands and fingers. These skills can be developed by teachers and incorporated into the classroom curriculum. She concludes that handwriting skills are prerequisite for cognitive, perceptual, and motor development that allows students success with academic tasks.

Highsmith (1988) describes six strategies for teaching handwriting skills. They include teaching children with motor coordination problems integrating the tactile modality by suing sandpaper letters, incorporating cursive writing to reduce directional confusion, emphasizing student practice

with baseline consistency, practicing visual spatial skills and spacing, teaching cursive, and cross modal integration to remediate reversal problems. She concludes that a means of providing instruction is needed for teachers in order to develop methods that both motivate and improve the use of writing skills.

In Lynch's (1987) research it was found that as a result of specific training, growth in visual-motor skills was significant. Children were given tasks and worksheets designed to improve visual-motor skills as they relate to reading ability. It was concluded that improvements in ocular-motor and visual-motor skills correlated to improved reading performance.

Miller's (1986) work in art provided a conduit for creative teaching of eye-hand development. She found that fine motor movements of the arms, hands, and fingers could be enhanced by coloring, tracing, and modeling. She concluded that many children with writing difficulties also had rigid and reduced hand flexibility. Utilizing her methods these movements could be improved thus improving written competencies.

Moskowitz (1988) developed specific methodology and strategies for students that are unable to perform functions received through the eyes. Among these functions are specific activities of fine motor movement such as handwriting. She developed lists of practical activities

that would inform teachers about specific visual-motor deficits. She emphasized that student's strengths should be used that would allow for compensatory instructional methods to facilitate learning in the content areas.

The book entitled Learning Process Skills authored by Riley (1992) was specifically written to allow teacher's insight into those children who are experiencing academic problems associated with cross modal integrative processes. One specific area addressed by this researcher is kinesthetic processing which includes written activities. Common problems associated with visual processing were laterality and directionality, ordinal position of letters, spelling sequence, and proper spacing while writing. His classroom activities ranged from gross manipulation of three dimensional objects through an intermediate level of visual-motor activities into age-appropriate fine motor tasks. As the student passes through each level of specific sensory-motor training proper input is received by the hands and eyes. Through these methods the child's ability to monitor visual-motor function develops the different modalities simultaneously.

Tansley (1986) defined educational activities for young children with developmental delays. Great emphasis is placed on sensory channels and the necessity of integration of these channels. Tactile/kinesthetic processes are considered by the author to be of critical importance in the

development of eye-hand coordination. Problems associated with lack of development would include mechanical reproduction, visual sequencing, closure, figure-ground, and form perception. Tansley feels strongly that his area of acquisition is neglected and that the development of tactile kinesthesis will further fine muscle activity as well as general motor movement. Another important point of this researcher is that the strong channel or modality should be used to train the weak channel. The final hypothesis that Tansley implores is that good reading and spelling depend upon cross modal integration of skills.

Communication disordered and neurologically impaired children also benefit from visual-motor training. Busby (1985) reports on a vision enhancement program incorporated into the school setting. Students were initially screened by a licensed optometrist and revealed that eighty-five percent of the total elementary population demonstrated eye-movement difficulty, eye-hand coordination problems and/or some form of perceptual impairment. The Vision Enhancement Program showed that students were able to attend to printed material for an extended period of time. Students exhibited decreased incidences of distractibility and were more willing to participate in classroom assignments after participating in the program. Marked improvements in peer relationships were also noted upon termination of participation in the program.

Dorman's (1987) work examined neurological impairment, dyslexia, dysgraphia, and dysarthria. Graphomotor dyscoordination in drawing, puzzles, and block construction of the neurologically impaired was observed in reading deficient children. Dorman's study drew from categories of neurologically impaired children including cerebral palsy, neuromuscular disorders, spina bifida, and head injury. Conclusions of this research indicates that reading/spelling deficiencies can relate to neurological impairment. In fact current terminology describing dyslexia and associated graphomotor problems denotes neurological etiology.

Erhardt's (1990) extensive study of visual defects related to cerebral palsy and the various damages and impaired functions. Due to the magnitude of complications presented by the overall cerebral palsy condition, Erhardt found that insufficiencies, such as visual-motor integration, seemed to go undetected or were of secondary importance. Even though specific visual disorders affecting overall functional skills were found in nearly sixty percent of all children diagnosed with cerebral palsy the vast majority have gone unremediated. The researcher emphasizes practical programming which includes developmental and functional optometry as one of several clinical approaches for remediating academic skills such as handwriting.

Miller (1986) outlines the significance of using art to improve eye-hand coordination skills while enhancing

language development skills in school-aged children. She indicates that art can be used to encourage language delayed children to sequence events, describe events and encourage word relationships. Miller emphatically states that exceptional children commonly have poor self images. She advocates that the use of art to remediate integrative processes can foster self-confidence and improve the concept of self hence, fostering academic success.

The literature review has generated several areas of thought. Visual-motor integration skills are measurable. Visual-motor integration skills affect mechanical abilities, specifically handwriting skills. Handwriting skills can affect children's overall academic performance. Visual-motor skills responds to remediation.

Description of the Selected Solution

The focus of this practicum was visual-motor integration skills and their impact on handwriting in school-aged children. Historical and current review of literature bring together the hypothesis that with specific intervention, handwriting can be affected (Gesell, 1949 & Getman, 1992).

The writer developed a plan that will employed the use of specific remedial mechanical skills. Computerized and cross modal interventions were utilized. Specifically, computer programs designed to develop visual tracing, closure, pursuits, and spatial integration were utilized.

Methods included haptic writing and visual auditory tactile kinesthetic integration (VATKI) were used to reinforce the visual-motor process. A clinical setting provided the population base of academically and behaviorally disordered children referred. Professionals, parents, and support staff interacted in implementing and carrying out the practicum goals.

The writer accepted referrals, assessed student needs, and treated visual-motor deficiencies as they related to handwriting. Suggestions were provided to parents and teachers to enhance the children's visual-motor capabilities.

The writer notes that throughout this practicum the terms visual-motor integration, visuomotor, graphomotor, eye-hand coordination, visual processing, integrative processing disorder, visual modality, visual channel, and fine motor skills will be used interchangeably. These terms all relate to handwriting functions and are frequently utilized in the literature.

Report of Action Taken

This practicum was implemented for a three month period. This project centered around remediating handwriting skills in school-aged children who displayed visual-motor deficiencies that affect mechanical skills. Since the development of these mechanical functions are

prerequisite for complete academic achievement, a student population was chosen as the target population.

During week one of this practicum, the writer initiated the intake procedure. Ten referrals were accepted. Referrals were generated from four parents, three psychologists, and three teachers. Reports from professionals involved with the children were collected in order to address the child's medical, visual, and psychological background. A parent handwriting inventory was issued to each child's caretaker who was participating in the project. Each child's teacher was also given a handwriting inventory to complete. All ten parents of the participating children completed a case history form. This information was accumulated by the writer and placed in a folder for future reference during the assessment phase of the program.

Week two consisted of conducting assessments of visual-motor abilities and handwriting using formal and informal methodology. A Standardized test of visual-motor integration was used to note differences in eye-hand coordination. Formal handwriting scales were used to analyze handwriting proficiency. Teacher inventories were collected and analyzed. These inventories provided the writer with the teacher's impressions of the children's visual-motor integration performance. Parent inventories

were used to solicit parental impressions of the child's handwriting skills.

Week three was utilized to design prescriptive plans for remediating handwriting deficits based upon assessed needs. Since many of the children demonstrated handwriting difficulties, visual skills deficits, and visual-motor insufficiencies, tracing, closure, and spatial integration difficulties were addressed.

During weeks four through eleven the writer provided specific remediation and treatment related to the development of handwriting and academic functioning (see Appendix E). For example, week four the children drilled upon tracing activities via computerized instruction and pencil paper tasks.

Week five and six consisted of drills focusing upon closure through haptic writing methods which emphasized cross-modal integration development of visual processes. The Visual Auditory Tactile Kinesthetic Integration (VATKI) method was also utilized.

During weeks seven, eight, and nine the children drilled on skills to enhance visual-motor integration utilizing computerized methodology, pencil and paper tasks involving haptic training and VATKI techniques.

Week ten focused on spatial integration drill with computer assisted instruction emphasizing visual perspectives. During this week haptic instruction and VATKI

methodology was continued in order to facilitate the complete process of handwriting.

Weekly remedial sessions consisted of specific computerized developmental vision enhancement and direct instruction utilizing paper and pencil. Specific programs developed for cognitive and visual rehabilitation stressed tracing, closure, and spatial integration.

Week eleven culminated actual hands on remediation with a review of specific handwriting tasks. Information was collected on an ongoing basis and performance was charted througout the practicum.

Week twelve consisted of conducting the post assessment and writing a final report noting measured differences. Suggestions for teachers and parents were included in the reports (see Appendix F). The post assessment consisted of evaluating visual-motor integration and handwriting skills. A standardized test of visual-motor integration was used to assess visual-motor integration performance and noted marked differences in eye-hand coordination. Formal handwriting scales assisted in the analysis of handwriting proficiency. Teacher inventories were reissued in order to solicit post impressions of treatment. Gains in handwriting abilities were observed. Parent inventories were also distributed and generated marked improvements in the children's handwriting abilities.

CHAPTER V

RESULTS, DISCUSSION AND RECOMMENDATIONS

Results

A problem existed in that many school-aged children demonstrated visual-motor integration deficits that affected mechanical aspects of eye-hand corrdination skills needed for writing, spelling, mathematics, and written expression. Visual-motor integration programs to enhance handwriting were not available in the community, nor was training provided in the school setting. Consequently, many children presented academic difficulties related to handwriting deficiencies and many parents were forced to seek private remedial services to alleviate the problem for their child.

The writer designed a solution strategy which was implemented during a twelve week period. This strategy consisted of designing a plan to enhance visual-motor integration skills and handwriting abilities.

The goal of the program was to effectively remediate handwriting skills in school-aged children who displayed visual-motor deficiencies that affected mechanical skills. Four objectives were incorporated into the program to facilitate this practicums success. Objective number one

indicated that 6 of 10 students would improve visual-motor integration skills (see Figure 1). This outcome was assessed by analyzing pre and post tests results. Although it was estimated that 6 of 10 children would show improvement in visual-motor integration skills, 8 of 10 children actually improved. Objective two consisted of 4 of 10 students improving visual skills (see Figure 2). Pre and post assessment measures indicated that 5 of 10 children actually improved visual skills as related to handwriting functioning. It would be noted that both objective number one and number two exceeded the writer's expectations. Hence, the children seemed to respond favorably to the prescribed interventions. Objective number three included that handwriting skills of the children would show a measurable improvement (see Figure 3). An overall analysis of the intervention indicates that handwritng can be improved through remedial techniques. Objective number four included teachers and parents reporting marked improvement in handwriting (see Figure 3). All of the parents and teachers who responded to the postquestionairre reported significant improvements in the children's handwriting abilities.

Discussion

When considering the outcomes of the projected objectives and the overall goal of the practicum, the positive value in handwriting programs is indicated. It

Figure 1

A Comparison of Pre and Post Data In
Relation to Visual-Motor Integration Skills

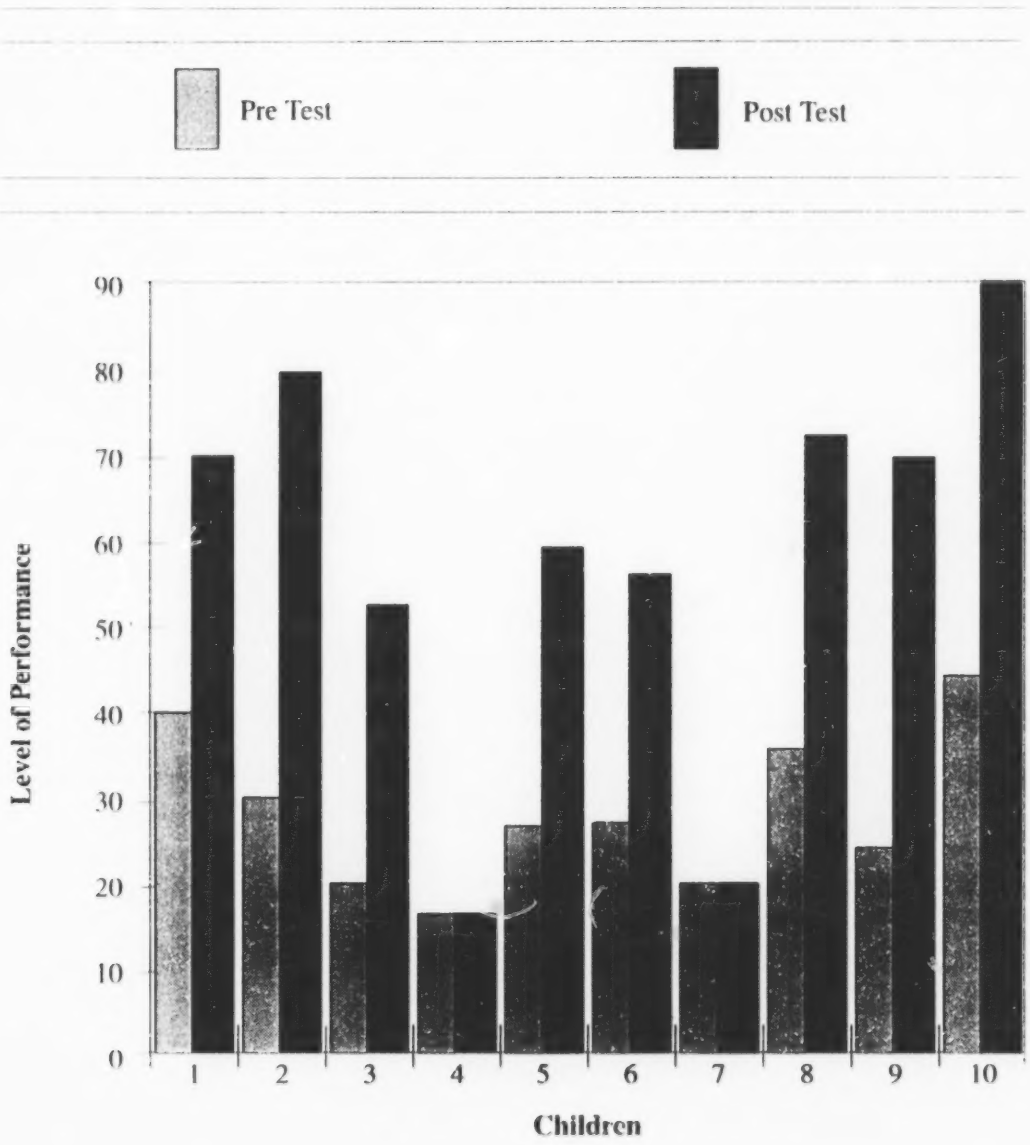

Figure 2

A Comparison of Performance Data
Related to Visual Skills

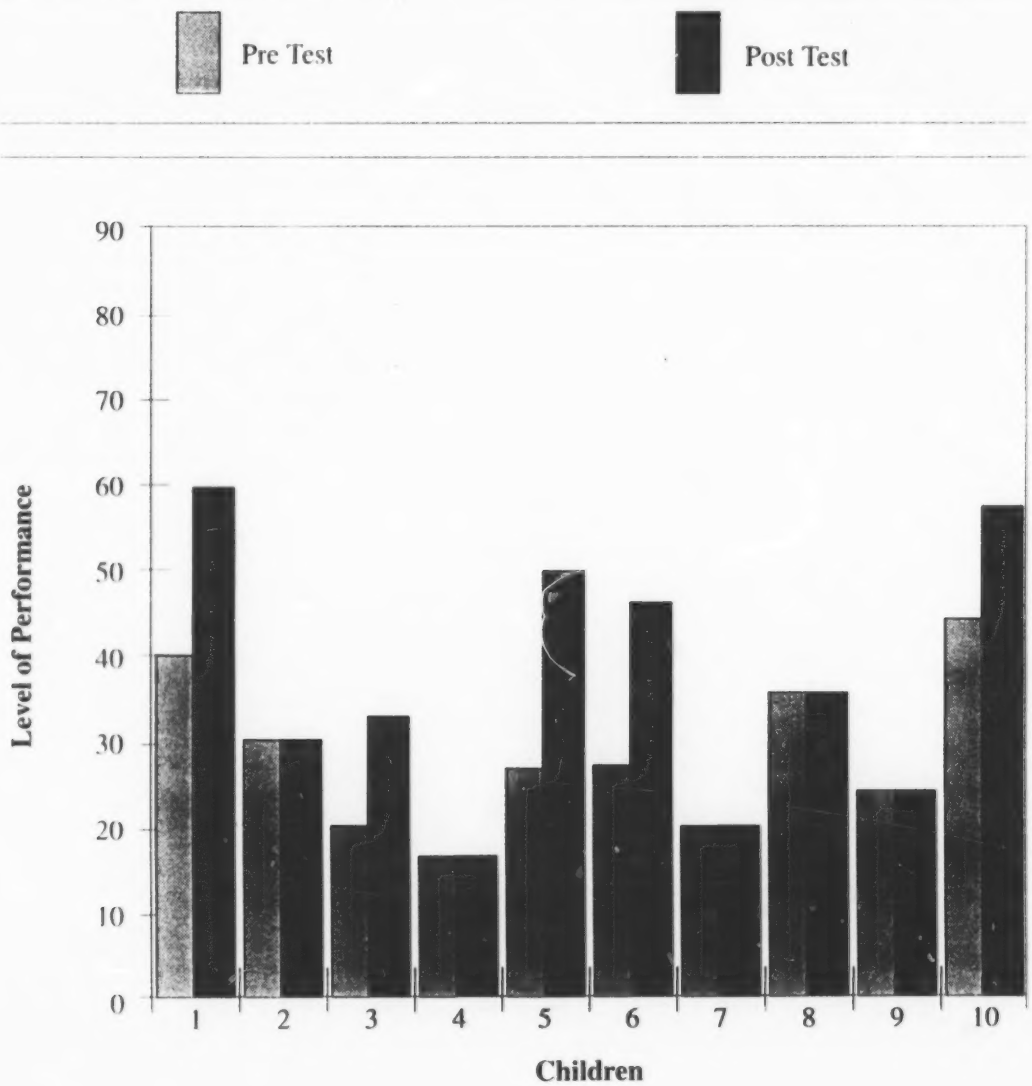

Figure 3

Analysis of Handwriting Intervention

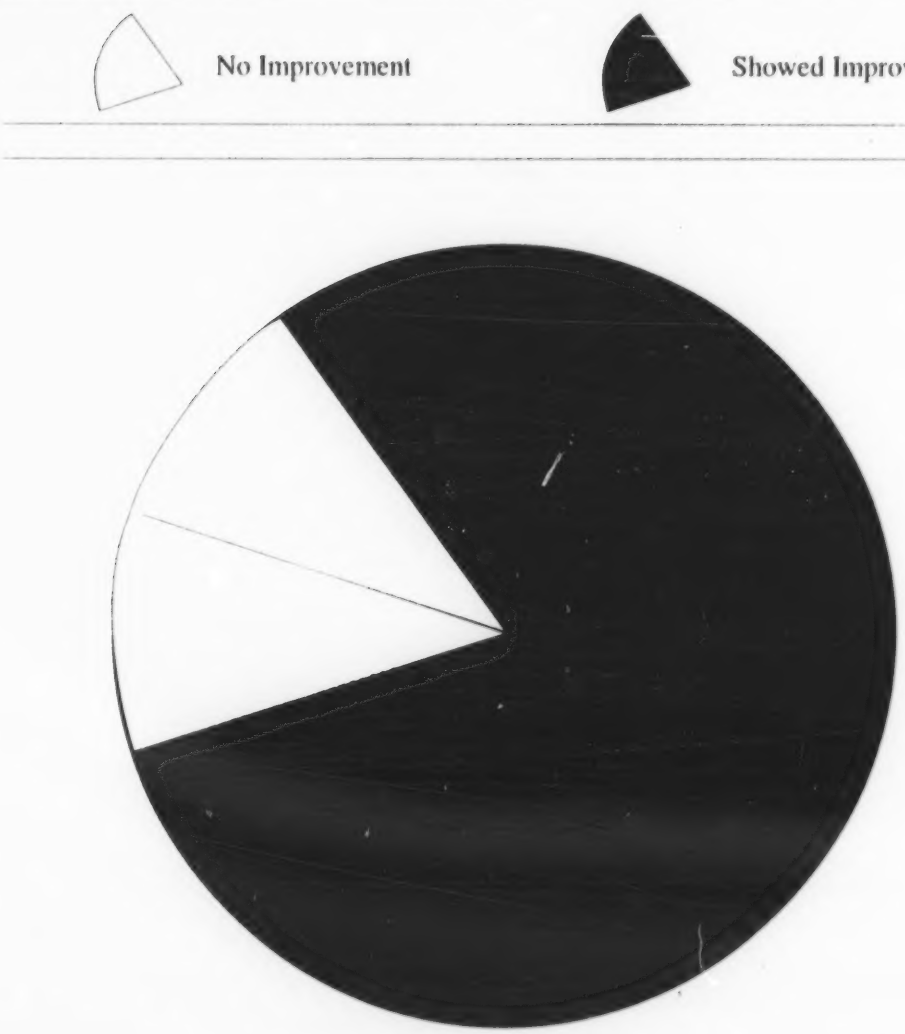

Figure 4

Program Effectiveness As Reported
by Teachers and Parents

appears that by remediating cognitive processes and providing hands on paper and pencil tasks, children's handwriting skills can improve.

The parents, teachers, and school administrators were very interested in the intervention strategies and were supportive to the children during their participation. A sense of cooperation was demonstrated by all principles involved.

An unexpected outcome of this practicum was generated in that school personnel showed an increased interest in referring students for visual-motor integration therapy. The root of the referrals are being generated due to the success of this practicum. There seems to be a renewed interest within the community in regards to handwriting remediation.

Results of this practicum support the research which indicates that through remediation and treatment handwriting can be improved. The interventions designed in this practicum were limited in scope due to the specified duration of the project. Given a longer remediation period, the chances that the childrens' handwriting skills would increase.

Recommendations

When developing a program to meet the visual performance needs of children close attention must be paid to assessments, level of function and goals. Handwriting

skills consists of a series of closely integrated visual-motor output responses matched with equally important visual input stimuli. Since basic vision is a learned skill all subsequent skills that arise can also be learned.

The child that is afflicted with problems of this nature usually has difficulty with other aspects of gross and fine motor development. It is critically important that schools take into account individual differences in children and structure programming to accept these differences. The problems manifested in mechanical abilities can range from mild to severe. Few individuals are the same and subsequently few visual-motor problems are the same. As a result of these varying degrees and levels of disorder it is important to diagnose properly and intervene early. The writer sees many children with diagnosed visual-motor disorders, however, it rarely is at an early age. Generally the child has met with much frustration and school difficulty prior to structured intervention.

Specific problems as mentioned above must be understood prior to developing a comprehensive intervention plan. Primary points to be considered are 1) awareness in the schools of visual-motor deficiency, 2) identification structure, 3) referral, 4) diagnosis, 5) remediation, and 6) follow-up between parents, school, and outside services.

If early identification and intervention plans are effectively carried out visual-motor delays that affect handwriting can be greatly improved.

Dissemination

The writer has shared this practicum with all teachers, administrators, and parents who were directly involved in the project. Many educators indicated that a need exists for developing a continuing plan for identification, diagnosis and remediation.

Copies of the approved practicum will be shared with the local school system and area curriculum coordinators. Furthermore this information will be shared with local eye care professionals, rehabilitation program directors, and local public and private developmental preschool programs.

The writer plans to present an inservice program discussing the merits of the findings of the practicum. All local individuals, both professional and non-professional, who showed interest in the practicum will be invited to attend. Finally, the writer plans to prepare an article for a local family oriented publication that is disseminated to professionals serving young children.

References

Aksionoff, E.B., & Falk, N.S. (1992). The differential diagnosis of perceptual deficits in traumatic brain injury patients. Journal of the American Optometric Association, 63(8), 554-558.

Alston, J. (1985). The handwriting of seven to nine year olds. The British Journal of Special Education, 12(2), 68-72.

Bailey, I.L. & Hall, A. (1989). A model for training vision functioning. Journal of Visual Impairment & Blindness, 10, 390-396.

Battle, J. & Labercane, G. (1985). Comparing achievement, ability, with visual memory and visual association. Reading Horizons, 25(2), 87-94.

Blanksby, D.C. (1992). Visual therapy: A theoretically based intervention program. Journal of Visual Impairment and Blindness, 291-294.

Breen, M.J., Carlson, M., Lehman,J. (1985). The Revised Developmental Test of Visual Motor Integration: Its relation to the VMI, WISC-R, and Bender Gestalt for a group of elementary aged learning disabled students. Journal of Learning Disabilities, 18(5), 266-272.

Caskey, W.E. & Larson, G.L. (1983). Relationship between selected kindergarten predictors and first and fourth grade achievement test scores. Perceptual and Motor Skills, 56(3), 815-822.

Dorman, C. (1987). Reading disability subtypes in neurologically impaired students. Annals of Dyslexia, 37, 166-188.

Erhardt, R.P. (1990). Developmental visual dysfunction: models for assessment and management. Arizona: Therapy Skill Builders.

Farrell, D. (1988). Strategies for teaching handwriting to LD students. (ERIC Document Reproduction Service No. ED 299 784.)

Farren, S. (1984). Optometrist dispute M.D.'s on learning disabilities: Vision and learning definitely linked. American Optometric Association News, 23(16), 1-2.

Formsma, R. (1988). Literature on evaluation of handwriting. Paper presented to Indiana University. (ERIC Document Reproduction Service No. ED 298 504.)

Gallahue, D.L. (1983). Perceptual aspects of motor performance. (Paper Presented at the National Convention of the American alliance for Health, Physical Education, Recreation and Dance). Minneapolis, Minnesota. (ERIC Document Reproduction Service No. ED 230 545.)

Gessel, A.L. (1949). Vision, its development in infant and child. New York, New York: P.B. Hoeber.

Getman, G.N. (1992). Smart in everything except school. Santa Ana, California: OEP/Vision Extension, Inc.

Gets, D.J. (1983). Visual skills essential for reaching learning potential. California Optometry, 9(10), 3-4.

Graham, S. (1986). A review of handwriting scales and factors that contribute to variability in handwriting scores. Journal of School Psychology, 24, 63-71.

Helveston, E.M. (1985). Visual function and academic performance. American Journal of Opthamology, 99(3), 346-355.

Hendrickson, H. (1988). Spelling: a visual skill. Academic Therapy, 23(4), 389-395.

Highsmith, V. (1988). Remediating handwriting skills for learning disabled students. (ERIC Document Reproduction Service No. ED 299-783.)

Klein, N.K. (1988). Children who are very low birthweight: cognitive abilities and classroom behavior at five years of age. Journal of Special Education, 22, (1), 41-52.

Kolata, G. (1987). Early signs of school age IQ. Science, 236(4803), 774-775.

Koslowe, K.C. (1991). Binocular vision, coding tests and classroom achievement. Journal of Behavioral Optometry, 2(1), 16-19.

Knoff, H.H. & Sperling, B.L. (1986). Gifted children and visual-motor development: A comparison of bender-gestalt and vmi test performance. Psychology in the Schools, 23, 247-251.

Lesiak, J. (1984). The Bender Visual Motor Gestalt Test: implication for the diagnosis and prediction of reading achievement. Journal of School Psychology, 22, 391-405.

Lynch, R.A. (1987). The effects of visual training on the reading achievement of fifth grade students. Master's Thesis: Keen College of New Jersey. (ERIC Document Reproduction Service No. ED 283 130).

Miller, M. (1986). Art-a creative tool in teaching. Academic Therapy, 22(1), 530-56.

Moon, C., Marlowe, M., Stellern, J., & Errera, J. (1985). Main and interaction effects of metallic pollutants on cognitive function. Journal of Learning Disabilities, 18(4), 217-221.

Moskowitz, F.C. (1988). Strategies for mainstreamed students. Academic Therapy, 23(5), 541-546.

Mozlin, R., Rumpf, D.A., Solan, H.A. (1985). The relationship of perceptual motor development to learning readiness in kindergarten: a multivariant analysis. Journal of Learning Disabilities, 18(6), 337-344.

Petti, M. (1988). Educational implications of the Bender. Academic Therapy, 23(4), 425-429.

Richards, R.G. (1985). Wasting teachers time. Academic Therapy. 20(4), 411-418.

Riley, S.R. (1992). Learning Process Skills. California: Academic Therapy Publications.

Row, S.M. (1989). An investment of visual cognition among children with severe visual impairments. Canadian Journal of Special Education, 5(2), 145-151.

Sears, C.J. (1985). Recognition of learning problems accompanying primary handicapping conditions and their impact on instructional programs for multihandicapped students. Paper presented at the Annual Convention of the Council for Exceptional Children, 63rd, Anaheim, California. (ERIC Document Reproduction Service No. ED 257 276).

Stein, J. & Fowler, S. (1985). Effect of monocular occlusion on visuomotor perception and reading in dyslexic children. The Lancet, 69-73.

Tansley, A.E. (1986). Perceptual training: Educational developmental programs. Arizona: Communication Skill Builders.

Trap-Porter, J., Cooper, J., Hill, D., Swisher, K., LaNunziata, L.L. (1984). D'Nealian and zaner-bloser manuscript alphabets and initial transition to cursive handwriting. Journal of Educational Research, 77(6), 343-345.

Vogel, S.A. (1990). Gender differences in intelligence, language, visual-motor abilities, and academic achievement in students with learning disabilities: a review of the literature. Journal of Learning Disabilities, 23(1), 44-51.

Woollacott, M.H. (1983). Children's changing capacity to process information. Paper presented at the convention of the American Alliance for Health, Physical Education, Recreation, and Dance, in Minneapolis, Minnesota. (ERIC Document Reproduction Service No. ED 229 380).

APPENDIX A

REFERRAL FORM

REFERRAL FORM

Referral Date: _____

Patient/Client Name: _____

Address: _____

Telephone: _____

Referral Agency: _____

Individual Referring: _____

Reason for Referral: _____

_____

_____

_____

APPENDIX B

CASE HISTORY

WELCOME TO OUR OFFICE

CASE HISTORY

Vision **Date** _____

Speech

Language

Academic

Patient Name _____

Address _____ Phone_____

_____

Date of Birth _____ Soc.Sec.# _____

Employer _____ Work Phone _____

Family Physician _____ City/State _____

Insurance: Vision Medical Medicare Medicade Other

Company Name: _____

Group Number: _____

Individual Claim Number: _____

Person Responsible for Charges: _____

Address: _____

_____

Phone: _____

GENERAL HISTORY

Reason for Today's Visit _____

List all Major Health Problems _____

_____

Medications Currently Taking _____

Do You Use a Computer? YES NO

Do You Experience Headaches? YES NO

Date of Last Vision Exam _____

Date of Last Hearing Exam _____

Do you Wear Glasses? YES NO Hearing Aid? YES NO

Do You Have Problems With Vision? YES NO

Indicate Problem Areas:

_____ Eyes Blur _____ Amblyopia ____ Alignment

_____ Repeating Lines _____ Skipping Lines

_____ Reversals _____ Eye Hand Coordination

_____ Other

Explain: _____

_____

Do You Have Problems With Speech? YES NO

Explain: _____

_____

Do You Have Problems With Memory? YES NO

Explain: _____

_____

ABOUT THE CHILD

Birth Was: Premature ___ On Time ___ Birth Weight ___

Were There Any Complications During Pregnancy or Delivery? _____

_____

History of Ear or Hearing Problems? YES NO

Explain: _____

_____

List Medications Currently Taking? _____

_____

Hospitalizations/Surgery/Major Accidents? Y N

Explain: _____

_____

How Old Was the Child When He/She Began Walking? _____

Talking? _____ Riding a Bike? _____

School Attending _____ Grade _____

Regular Class _____ Special Education Classes _____

Has the Student Repeated a Grade? YES NO

Has the Child Attended Transition? YES NO

Is the Child Achieving at Expected Levels? YES NO

Indicate Any Problem in the Following Areas:

_____ Reading _____ Mathematics _____ Spelling

_____ Writing _____ Language Arts _____ Other

Is the Student Being Tutored? YES NO

APPENDIX C

TEACHER HANDWRITING CHECKLIST

Teacher Handwriting Checklist

NAME: _____ D.O.B. ____

SCHOOL: _____ GRADE: ___

Circle the following yes or no responses

1. Does the child have adequate motor coordination?

Y N

2. Has the child established hand preference?

Y N

3. Does the child use proper pencil grip?

Y N

4. Does the child work from left to right?

Y N

5. Does the child discriminate shape form?

Y N

6. Can the child copy board work?

Y N

7. Can the child write letters from memory?

Y N

8. Does the child reverse letters?

Y N

9. Does the child turn or rotate paper?

Y N

10. Does the child use proper spacing?

Y N

11. Are written symbols the appropriate size?

Y N

12. Does child mix capital and lower case?

Y N

13. Does the child observe the lines on paper?

Y N

14. Is the child excessively slow when writing?

Y N

15. Teacher Comments _____

_____

_____

_____

APPENDIX D

PARENT HANDWRITING INVENTORY

Parent Handwriting Inventory

NAME: _____ TELEPHONE: _____

ADDRESS: _____

_____

DATE OF BIRTH: _____ GRADE: _____

Circle the Correct Response Regarding Your Child

1.	Does your child follow directions?	Y N
2.	Which hand does your child prefer to use?	L R
3.	Can your child identify letters or numbers?	Y N
4.	Does your child have good motor coordination?	Y N
5.	Does your child hold his pencil correctly?	Y N
6.	Can your child write?	Y N
7.	Does your child write from left to right?	Y N
8.	Does your child reverse letters or numbers?	Y N
9.	Does your child write too large or too small?	Y N

10. Explain your child's ability or inability to write letters and symbols. _____

_____

_____

APPENDIX E

REMEDIATION TECHNIQUES FOR IMPROVING HANDWRITING

REMEDIATION TECHNIQUES FOR IMPROVING HANDWRITING

In order for the child to gain maximum beneficts from these these activities he must be in a position to receive simultaneous input from visual, auditory, vocal and hands-on perspectives. Generally, what will occur is that while the hand is tracing the letter or words the eyes will see it, the voice will say it, and the ears will hear it.

It is of great importance that duing tracing activities that the child's body is centered with respect to the copy. Allow the center of the word to be even with his belt buckle or snap on his trousers. The child with midline inadequacies will gradually get his copy over to the side of the dominant hand. His head should be kept still while only his eyes should perform the movement.

It is important that teachers initially teach words that the child is familiar with. Later, while using this VATKI technique, the child will be able to expand his knowledge base and more complex words can be introduced.

1. While the child is watching, the teacher writes the word in large, cursive letters on a large piece of paper. The letters should be at least six inches tall. The teacher should say the word by syllables as it is written, achieving blending. Then the teacher says the whole word.

2. The child should trace the word with his finger saying it as he progresses. Have the child look at the whole word after he traces it and pronounces it.

3. Have the child trace the word in the air, saying sounds and syllables in a sequence blending together then saying the whole word. Repeat this 3 times or until the child has mastered this level.

4. Have the child write the word he just learned on a sheet of paper. (Do not allow him to look at the teacher's writing.) Have him write the word 3 times. If this skill breaks down and the child has difficulty after three attempts, repeat steps 2 and 3 then attempt 4 again.

5. Have the child close his eyes and get a visual image of the word. Spell the word by breaking it down into sounds and individual letters. For example: b - a - t; bat; or b - a - t - t - e - r; batter.

6. Request that the child write the word on an unlined card in using large flowing cursive letters. Have him say the sounds and/or syllables while writing. Next, have him say the entire word. The teacher should now print the word on the other side of the card.

7. The child should keep a file of the word cards for future reference and systematic review. Teachers should initiate word games with these cards and make learning a fun experience.

The following activities involve the haptic writing process. Materials needed are pencil and paper.

1. The teacher explains to the child that he will be taught to write on paper with his eyes closed at all times. The teacher then has the child perform free hand exercises with patterns while stressing awareness of movement to predict size, shape, and stroke of pattern. Reasonably accurate reproductions without the childs' eyes looking at his hand are expected.

2. The teacher places a dot on the paper and places the pencil on the dot. The teacher makes a line from left to right without looking at the pen. The teacher then to retraces the line accurately from right to left and back and forth using the feel of the arm movement as a guide to the length of the line. The child is asked to complete the same task. Several attempts are acceptable. The child should not move to the next step until this procedure is mastered.

3. The teacher draws geometrical shapes of circles, triangle, squares, etc. and traces them. The child is required to trace these shapes after a demonstration from the teacher. The goal is for the child to accurately reproduce shapes. Do not procede to the next step until the child has mastered this stage.

4. The teacher write letters of print or cursive as they are taught in the child's classroom. The child is required

to trace them then to accurately reproduce these letters independently before proceeding.

5. The teacher is to write words on a sheet of paper. The child is to trace these words then accurately reproduce them.

6. The teacher then holds the child's hand and makes lines, shapes, letters and words. The child is to tell the teacher what they produced without looking the their hands or the paper. The child should be familiar with the motion and the strokes. He must accurately identify forms before proceeding.

7. The child is required to produce shapes from memory with his eyes open but with his hand not in the field of view. Mastery is considered when the child can accurately reproduce shapes, letters, words, lines, and forms.

APPENDIX F

VISION DEVELOPMENT ACTIVITIES

VISION DEVELOPMENT ACTIVITIES

Children are not born with good visual skills. They must be learned through practice. The following is a list of activities that will help your child develop these skills.

General activities include: tracing, cutting, placing, painting, pasting, coloring, stringing, building, lacing, weaving, molding, tearing, folding, and hammering.

Apecific activities include playing with: chalk and chalkboard, paper and pencils, crayons, scissors, clay, play-doh, pegboards, puzzles, blocks, model games such as Lego blocks, Lincoln logs and Tinker toys, games that require skill and coordination such as bean bag toss, bolwing, and pick-up-sticks, playing on a balance board, throwing and catching, and batting balls.

Many companies make toys that help your child develop his visual system: Creative Playthings, Fisher-Price, Mattel, Playskool, Romper Room, Child Guidance, and Tonka.